

### **Amendments to the Claims:**

*This listing of claims will replace all prior versions, and listings, of claims in the application:*

1. (Currently Amended) A method for measuring a mechanical property of a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the method comprising:

altering an initial transmural force to obtain at least one altered transmural force wherein the step of altering includes the step of reducing the transmural force to obtain a reduced transmural force and wherein the step of reducing includes the step of applying an external pressure to the vascular wall;

measuring local changes in position of at least one location within the vascular wall resulting from physiologic pressures with the at least one altered transmural forces during the step of altering; and

determining a value for the mechanical property based on a measured amount of the local changes.

2. (Original) The method as claimed in claim 1, wherein the mechanical property is a non-linear elastic property of the vascular wall.

3. (Original) The method as claimed in claim 1, wherein the step of measuring includes the step of non-invasively, ultrasonically imaging the vascular wall.

4. (Cancel)

5. (Cancel)

6. (Currently Amended) The method as claimed in claim [5]1, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

7. (Currently Amended) The method as claimed in claim [4]1, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

8. (Original) The method as claimed in claim 1, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

9. (Original) The method as claimed in claim 1, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

10. (previously presented) A method for measuring a mechanical property of a vascular wall, the vascular wall being characterized by a relationship of arterial pressure versus strain that exhibits a relatively large slope under physiologic pressure caused by an arterial pressure pulse having a first mean arterial pressure and that exhibits a relatively small slope under physiologic pressure caused by an arterial pressure pulse having a second mean arterial pressure, the method comprising:

altering the first mean arterial pressure to obtain the second mean arterial pressure;

measuring local changes in position of at least one location within the vascular wall at the second mean arterial pressure; and

determining a value for the mechanical property based on the measured amount of the local changes.

11. (Original) The method as claimed in claim 10, wherein the step of measuring includes the step of non-invasively, ultrasonically imaging the vascular wall.

12. (Original) The method as claimed in claim 10, wherein the step of altering includes the step of reducing the first mean arterial pressure to obtain the second mean arterial pressure.

13. (Original) The method as claimed in claim 12, wherein the step of reducing includes the step of applying an external pressure to the vascular wall.

14. (Original) The method as claimed in claim 13, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

15. (Original) The method as claimed in claim 12, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

16. (Original) The method as claimed in claim 10, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

17. (Currently Amended) A method for determining health of a vascular structure including a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the method comprising:

altering an initial transmural force to obtain at least one altered transmural force wherein the step of altering includes the step of reducing the transmural force to obtain a reduced transmural force, wherein the step of reducing includes the step of applying an external pressure to the vascular wall;

measuring local changes in position of at least one location within the vascular wall resulting from physiologic pressures with the at least one altered transmural force during the step of altering; and

determining the health of the vascular structure based on the measured amount of the local changes.

18. (Original) The method as claimed in claim 17, wherein the step of measuring includes the step of ultrasonically imaging the vascular wall.

19. (Cancel)

20. (Cancel)

21. (Currently Amended) The method as claimed in claim [20]17, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

22. (Currently Amended) The method as claimed in claim [19]17, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

23. (Original) The method as claimed in claim 17, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

24. (Original) The method as claimed in claim 17, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

25. (Currently Amended) A system for measuring a mechanical property of a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the system comprising:

means for altering an initial transmural force to obtain at least one altered transmural force wherein the means for altering includes means for reducing the transmural force to obtain a reduced transmural force and wherein the means for reducing includes means for applying an external pressure to the vascular wall;

means for measuring local changes in position of at least one location within the vascular wall resulting from physiologic pressures with the altered transmural forces while the means for altering is altering the initial transmural force; and

means for determining a value for the mechanical property based on the measured amount of the local changes.

26. (Original) The system as claimed in claim 25, wherein the mechanical property is a non-linear elastic property of the vascular wall.

27. (Original) The system as claimed in claim 25, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

28. (Cancel)

29. (Cancel)

30. (Currently Amended) The system as claimed in claim [29]25, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

31. (Currently Amended) The system as claimed in claim [28]25, wherein the means for reducing includes means for reducing an internal pressure to the vascular wall.

32. (Original) The system as claimed in claim 25, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

33. (Original) The system as claimed in claim 25, wherein the means for determining includes means for directly estimating strain of the vascular wall.

34. (previously presented) A system for measuring a mechanical property of a vascular wall, the vascular wall being characterized by a relationship of arterial pressure versus strain that exhibits a relatively large slope under physiologic pressure caused by an arterial pressure pulse having a first mean arterial pressure and that exhibits a relatively small

slope under physiologic pressure caused by an arterial pressure pulse having a second mean arterial pressure, the system comprising:

means for altering the first mean arterial pressure to obtain the second mean arterial pressure;

means for measuring local changes in position of at least one location within the vascular wall at the second mean arterial pressure; and

means for determining a value for the mechanical property based on the measured amount of the local changes.

35. (Original) The system as claimed in claim 34, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

36. (Original) The system as claimed in claim 34 wherein the means for altering includes means for reducing the first mean arterial pressure to obtain the second mean arterial pressure.

37. (Original) The system as claimed in claim 36, wherein the means for reducing includes means for applying an external pressure to the vascular wall.

38. (Original) The system as claimed in claim 37, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

39. (Original) The system as claimed in claim 36, wherein the means for reducing includes the means for reducing an internal pressure to the vascular wall.

40. (Original) The system as claimed in claim 34, wherein the means for determining includes means for directly estimating strain of the vascular wall.

41. (Currently Amended) A system for determining health of a vascular structure including a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the system comprising:

means for altering an initial transmural force to obtain at least one altered transmural force wherein the means of altering includes means for reducing the transmural force to obtain a reduced transmural force and wherein the means for reducing includes means for applying an external pressure to the vascular wall;

means for measuring local changes in position of at least one location within the vascular wall resulting from physiologic pressures with the altered transmural forces while the means for altering is altering the initial transmural force; and

means for determining the health of the vascular structure based on the measured amount of the local changes.

42. (Original) The system as claimed in claim 41, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

43. (Cancel)

44. (Cancel)

45. (Currently Amended) The system as claimed in claim [44]41, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

46. (Currently Amended) The system as claimed in claim [43]41, wherein the means for reducing includes means for reducing an internal pressure to the vascular wall.

47. (Original) The system as claimed in claim 41, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic

pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

48. (Original) The system as claimed in claim 41, wherein the means for determining includes means for directly estimating strain of the vascular wall.